

# Nonsurgical Management of Acute Cholecystitis in Pregnancy: A Cautionary Tale

**AUTHORS:**

Hanks LR; Towner MN; Hollenbach SJ;  
Drennan KJ; Olson-Chen C

**CORRESPONDENCE AUTHOR:**

Courtney Olson-Chen, MD  
601 Elmwood Avenue, Box 668  
Rochester, NY 14642  
Phone: (585) 275-7480  
E-mail: courtney\_olson-chen@urmc.rochester.edu

**AUTHOR AFFILIATION:**

University of Rochester Medical Center,  
Department of Obstetrics and Gynecology,  
Rochester, NY 14620

<b>Background</b>	As the number of women who delay childbearing has grown, age-associated conditions like cholelithiasis and cholecystitis are increasingly common in pregnancy. We present lessons learned from a case of cholecystitis in pregnancy managed with a cholecystostomy tube.
<b>Summary</b>	A 42-year-old G4P2012 presented at 24w5d with acute cholecystitis. In consultation with general surgery, she was managed conservatively with cholecystostomy tube and antibiotics. The patient re-presented at 27w3d with recurrent cholecystitis, subsequently developing sepsis and preterm labor. She underwent emergent classical Cesarean delivery with concurrent cholecystectomy. Surgical pathology revealed acute on chronic cholecystitis. Cultures of the maternal blood and cholecystostomy tube grew group G Streptococcus.
<b>Conclusion</b>	Rates of gallbladder disease in pregnancy are increasing. This case suggests the use of a cholecystostomy tube may increase maternal and fetal complications associated with cholecystitis in pregnancy.
<b>Keywords</b>	Cholecystitis; percutaneous cholecystostomy; cholecystectomy; pregnancy

**DISCLOSURE STATEMENT:**

The authors have no conflicts of interest to disclose.

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## Case Description

As women have begun to delay childbearing, the incidence of age-related conditions like cholelithiasis and cholecystitis during pregnancy is expected to increase. This presents a challenge for surgeons who must determine the optimal management for this unique patient population. Concerns regarding the risks of anesthesia and surgery, both to a gravid patient and her fetus, render some clinicians reticent to proceed with surgical management of gallbladder disease. Indeed, some studies have suggested cholecystectomy to be associated with an increased risk of fetal loss. However, this was based on a small case series done before the advent of modern intraoperative care.<sup>1</sup> The percutaneous cholecystostomy tube (PCT) is a conservative treatment option for the management of cholecystitis in patients who are not appropriate surgical candidates.<sup>2</sup> There are a few case reports of successful use of PCT during pregnancy, though this treatment approach's safety has not been rigorously examined.<sup>3,4</sup> We present the case of a 42-year-old multiparous woman who was diagnosed with acute cholecystitis in the second trimester and underwent treatment with PCT and antibiotics.

The patient was a 42-year-old G4P2012 who presented at 24w5d with right upper quadrant (RUQ) pain, nausea, and vomiting. Past medical history was significant for obesity with a body mass index (BMI) of 42. Her obstetric history included two prior Cesarean deliveries. She also had a robot-assisted laparoscopic myomectomy eight months before pregnancy with the removal of multiple myomas and entry into the uterine cavity.

RUQ ultrasound revealed a nonmobile stone in the gallbladder neck, gallbladder wall thickening and edema, and RUQ tenderness with transducer pressure, all findings consistent with acute cholecystitis. There was no evidence of sepsis or preterm labor at the patient's initial presentation. Her blood pressure on presentation was mildly elevated; liver function tests, creatinine, and platelets were all within normal limits, and a urine protein to creatinine ratio was 0.30. Given the patient's symptoms and ultrasound findings, the clinical presentation was thought to be consistent with acute cholecystitis, rather than preeclampsia or hemolysis, elevated liver enzymes, and low platelet count (HELLP) syndrome. After discussing the case with a maternal-fetal medicine specialist at a nearby tertiary care hospital, the patient's obstetrician decided to transfer the patient due to the complexity of the clinical scenario, early gestational age, and the benefit of proximity to neonatal intensive care.

Upon the patient's arrival to the tertiary care center, a multi-disciplinary discussion was held between the maternal-fetal medicine and general surgery teams. Ultimately, concerns regarding risks to the fetus with surgical intervention led the general surgery team to recommend intravenous antibiotics with PCT placement and planned cholecystectomy after delivery. The patient underwent interventional radiology-guided PCT placement at 24w6d. She was treated with intravenous antibiotics and discharged home two days later with an improvement of her symptoms.

She returned to the hospital at 27w3d with recurrent RUQ pain. General surgery again recommended conservative management and an investigation for a different etiology of her pain. A repeat RUQ ultrasound was non-diagnostic but ruled out PCT displacement. A computed tomography (CT) scan was equally non-diagnostic. Due to the unclear source of her pain and concerns about the possibility of preterm delivery, she was given betamethasone to promote fetal lung maturity.

On hospital day two, she developed worsening abdominal pain and had an episode of oxygen desaturation to 85 percent and a fever of 38.4°C. Continuous maternal and fetal monitoring was initiated, broad-spectrum antibiotics were started, and repeat labs and blood cultures were collected. On hospital day three, she progressed into preterm labor, with her initially closed cervix dilating rapidly to 4 cm. A magnesium sulfate bolus was given for fetal neuroprotection. She was taken emergently to the operating room for Cesarean delivery of a viable male infant due to her obstetric history and fetal malpresentation. Following the closure of the hysterotomy, cholecystectomy was performed by general surgery without complications. Surgical pathology of the gallbladder revealed acute on chronic cholecystitis. Blood cultures ultimately confirmed group G *Streptococcus* bacteremia. A culture of the cholecystostomy tube taken at the time of delivery likewise grew group G *Streptococcus* and the *Klebsiella oxytoca*. Placental culture was negative.

## Discussion

An increasingly older maternal population amidst the obesity epidemic of the developed world is a setup for increasing rates of gallbladder disease complicating pregnancy. Early reports suggested an increased risk of fetal loss and preterm delivery associated with surgical management of cholecystitis in pregnancy.<sup>1</sup> Those risks fostered uncertainty and discomfort in clinicians tasked with treating the pregnant patient with gallbladder disease. However, the obstetric outcomes occurred with strikingly variable tim-

ing in relation to the index surgery, raising the question of how strongly cholecystectomy and the negative obstetric outcomes were related. Moreover, the findings are far less relevant today as historically patients underwent open cholecystectomy during pregnancy. Laparoscopic cholecystectomy is now known to be safer than the open procedure for both the pregnant woman and her fetus.<sup>5,6</sup> A more recent study compared outcomes of women undergoing cholecystectomy within the 90 days before delivery versus the 90 days after delivery, and the majority of cases were performed laparoscopically. Women undergoing cholecystectomy in pregnancy had higher rates of preterm delivery, but they also had more comorbidities. The study looked at cholecystectomy in the third trimester only, even though most of these surgeries occur in the first and second trimesters. The study did not report how many of the cases were performed for the diagnosis of acute cholecystitis, and they did not include women with cholecystostomy tubes.<sup>7</sup>

In 2017, the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) released their guidelines on the diagnosis and treatment of various surgical problems in pregnancy.<sup>8</sup> On the management of gallbladder disease, the Society notes that laparoscopic cholecystectomy is safe in pregnancy during any trimester and carries no significant risk to the mother or fetus. Indeed, several studies have supported the safety of laparoscopic cholecystectomy in pregnancy.<sup>9-11</sup>

Furthermore, there is a risk to not performing surgery which cannot be discounted. The metabolic and immunologic milieu seen with acute cholecystitis is a hostile environment for a developing fetus. The gravid body may respond to severe infection with abortive efforts to protect the fetus and mother from infection. In fact, both intra- and extra-abdominal infectious processes and sepsis are recognized causes of preterm delivery.<sup>12</sup> When gallbladder disease is uncomplicated without severe inflammation or infection, the rates of associated spontaneous abortion or preterm labor are similar whether the patient is managed with operative or non-operative treatment.<sup>9</sup> However, in the presence of acute cholecystitis, fetal death rates are higher with non-operative management compared to surgical management.<sup>13</sup> Reported fetal loss in the setting of complicated gallbladder disease ranges from 10 to 60 percent with rates of preterm delivery of up to 20 percent.<sup>14</sup>

The use of PCT for the treatment of cholecystitis in pregnancy is not a novel concept.<sup>3</sup> In cases where laparoscopic cholecystectomy is unable to be performed, either due to anatomic variations or patient indicators of surgical complexity, there are several potential alternative management options including PCT.<sup>15</sup> While the treatment has historically been reserved for high-risk patients (e.g., admitted to intensive care, aged, severe comorbidities), there have been case reports of the successful use of this technique in pregnancy as a means of postponing cholecystectomy until the postpartum period.<sup>4,16</sup> A recent randomized trial comparing laparoscopic cholecystectomy with percutaneous catheter drainage for acute cholecystitis in high-risk non-pregnant patients found that major complications were five times more likely in the percutaneous drainage group.<sup>17</sup> Complications of cholecystostomy tubes include hemorrhage, sepsis, catheter migration, bile leak, bowel perforation, need for reintervention, and increased length of hospital stay.<sup>17,18</sup>

We performed a chart review of all patients who underwent a percutaneous biliary drain placement in our institution from 2011 to 2017. Two hundred eighty-four patients received a drain during this time. The average age was 60.4 years, and more than half (52.1 percent) of the patients have died since drain placement. Sixty-two (21.8 percent) patients developed sepsis after placement of the tube. Fifty-nine subjects had positive drain cultures, and 50 of these had bacteremia.

There were no other pregnant patients who received a percutaneous biliary drain. Outside of our patient, only four other patients had a tube placement to treat cholecystitis. The reason for cholecystostomy tube placement for these patients was as follows: 1) too ill for surgery due to metastatic laryngeal cancer; 2) end-stage liver disease (cholecystectomy performed at the time of liver transplant about one month later); 3) esophageal cancer; and 4) hepatocellular carcinoma.

Ours is an example of an unsuccessful use of the treatment modality with subsequent development of procedure-related complications. The patient's culture results confirm acute cholecystitis resulting in biliary sepsis which ultimately precipitated preterm labor. The pathogens grown from the patient's PCT culture, group G *Streptococcus* and *Klebsiella sp.*, are two of the most commonly detected bacteria in cholecystostomy tubes.<sup>19</sup> There were no signs of chorioamnionitis on placental pathology or culture.

## Conclusion

Gallbladder disease is likely to be seen more often in pregnancy as women delay childbearing and enter pregnancy with higher rates of obesity. When complicated gallbladder disease occurs in pregnancy, attempting to postpone definitive treatment is not in the best interest of the woman or her fetus and may increase the risk of preterm labor or fetal loss. Laparoscopic cholecystectomy is the standard of care for the management of complicated gallbladder disease in pregnancy. While PCT has been used in pregnancy to postpone cholecystectomy, it is not the standard of care. It may put the woman and her fetus at increased risk of complications as compared to laparoscopic cholecystectomy.

## Lessons Learned

In this case, nonsurgical management of cholecystitis resulted in an adverse pregnancy outcome. We suggest that definitive surgical management be strongly considered in the setting of cholecystitis during pregnancy.

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